

Four new species of *Stylidium* Sw. (Stylidiaceae) from northern Australia

A.R.Bean

Summary

Bean, A.R. (2010). Four new species of *Stylidium* Sw. (Stylidiaceae) from northern Australia. *Austrobaileya* 8(2): 107–117. Three new species belonging to *Stylidium* subgenus *Andersonia*; *S. exiguum* A.R.Bean, *S. notabile* A.R.Bean and *S. osculum* A.R.Bean, are described from the Northern Territory. One new species belonging to *Stylidium* section *Floodia* Mildbr., *S. centrolepoides* A.R.Bean, is described from Queensland. All species are illustrated and a distribution map provided.

Key Words: Stylidiaceae, *Stylidium*, *Stylidium centrolepoides*, *Stylidium exiguum*, *Stylidium notabile*, *Stylidium osculum*, Australia flora, Northern Territory flora, Queensland flora, taxonomy, new species

A.R.Bean, Queensland Herbarium, Department of Environment & Resource Management, Brisbane Botanic Gardens, Mt Coot-tha Road, Toowong 4066, Queensland, Australia. Email: tony.bean@derm.qld.gov.au

Introduction

The three new species of *Stylidium* Sw. (Stylidiaceae) named here from the Northern Territory have come to light largely through the collections, photographs and observations of Kym Brennan. While all had been collected beforehand, their status as new species had been overlooked because of the difficulty of interpreting floral characters from pressed *Stylidium* specimens. These new species belong to *Stylidium* subgenus *Andersonia* (R.Br. ex G.Don) Mildbr. A previous revision of this subgenus (Bean 2000) enumerated 37 species. The fourth new species, belonging to *Stylidium* section *Floodia* Mildbr., was collected in 2001 near Croydon in Queensland. A previous revision of this section (Bean 1999) enumerated 12 species.

Materials and methods

The paper is based on the morphological examination of herbarium material at BRI and DNA, including material preserved in spirit. Terminology is the same as that used in Bean (1999) and Bean (2000). Floral measurements are based on material preserved in spirit or reconstituted in boiling water. All other measurements are based on dried material.

Length and width dimensions are indicated as length × width followed by the measurement unit.

Taxonomy

***Stylidium exiguum* A.R.Bean species nova**
S. nominato affinis sed petalis omnibus conspicue lobatis, petalis posterioribus quam anterioribus multo longioribus, petalorum posteriorum lobis divergentibus, paracorolla praecipue alba et capsulis brevioribus differens.
Typus: NORTHERN TERRITORY. Nabarlek, outcrops N of lease entrance, 26 April 2008, *K.Brennan* 7576 (holo: BRI [1 sheet + spirit]; iso: DNA).

Stylidium nominatum Carlquist, *sensu* Bean (2000), excl. type.

Annual herb, 3–15 cm high with globose glandular hairs 0.03–0.1 mm long. Rootstock not thickened. Stems present, glabrous. Leaves in basal rosette and scattered along stems, green. Basal leaves 5–15, oblanceolate, 2.5–9 mm long including petiole, 0.5–1.5 mm wide, glabrous, apex obtuse, base cuneate. Cauline leaves 4–11, linear, 2–4.7 mm long including petiole, 0.3–0.7 mm wide, glabrous, apex obtuse or acute, base cuneate or truncate, margins entire. Petioles absent or to 2.5 mm long. Scapes absent. Inflorescences 1–6 cm long, indeterminate; branches monochasially cymose. Bracts linear, 1.5–3 mm long,



Fig. 1. A–C. *Styliidium exiguum*. A. whole plant $\times 4$. B. flowering branchlet $\times 8$. C. corolla and paracorolla $\times 8$. D–F. *Styliidium osculum*. D. whole plant $\times 2$. E. flower $\times 4$. F. corolla and paracorolla $\times 8$. A–C from Brennan 7560 (BR1); D–F from Brennan 7539 (BR1).

glabrous, apex obtuse or acute. Pedicels absent. Hypanthium linear, glandular-hairy at distal end only. Sepals deltate, 3 free and 2 mostly fused, $1.2\text{--}2.4 \times 0.2\text{--}0.4$ mm, glabrous or glandular-hairy, apex acute. Corolla white, glandular-hairy on tube and underside of petals. Corolla tube $0.5\text{--}1.6$ mm long, with sinus on anterior side only. Paracorolla discontinuous or continuous, lobed, thin, glabrous, $0.2\text{--}0.5$ mm high. Paracorolla lobes 2 or 4, similar, hemispherical, <0.2 mm long,

obtuse, 2 opposite the posterior petals, 0 or 2 opposite the anterior petals. Paracorolla glands absent. Labellum attached to outside of corolla tube or attached at base of anterior sinus of corolla tube, ovate or lanceolate, $0.3\text{--}0.7$ mm long, glabrous; terminal appendage absent or present, to 0.2 mm long; basal appendages absent. Petals all free, $A1+A2+P1+P2$. Anterior petals obdeltate, $0.6\text{--}1.9 \times 0.6\text{--}1.5$ mm, bilobed, obtuse. Posterior petals obdeltate, $1.3\text{--}3.3 \times 1.2\text{--}3.3$



Fig. 2. *Stylidium exiguum*. Photograph of corolla, paracorolla and column (from *Brennan 7576*).

mm, bilobed, obtuse. Column 2.5–5 mm long, of uniform width throughout, glabrous, lateral lobes absent, spur absent. Stigma sessile. Capsule linear, without raised longitudinal ribs, 4.5–12 mm long excluding sepals, 0.3–0.6 mm wide, halves detaching distally, not recurving. Seeds ellipsoidal, 0.15–0.2 mm long, brown, smooth. **Fig. 1A–1C, 2.**

Additional specimens examined: NORTHERN TERRITORY. Nabarlek, outcrops N of lease entrance, Apr 2008, *Brennan 7560* (BRI); Melville Island, Apr 1987, *Fensham 481* (DNA); Arnhem Land, 19 km E of Jabiru, Apr 1989, *Johnson 4557* (BRI); Cooper Creek area, Apr 1979, *Rankin 2213* (DNA).

Distribution and habitat: *Stylidium exiguum* is endemic to the Northern Territory, and has

been found in Kakadu N.P. and on Melville Island (**Map 1**). It inhabits moist sandy soils in the vicinity of sandstone outcrops.

Phenology: Flowers and fruits are recorded from April to June.

Affinities: *Stylidium exiguum* is closely related to *S. nominatum* Carlquist, and was confused with it by Bean (2000). Both are of small size, possess both basal and cauline leaves, and have small (mostly) white flowers.

In *Stylidium exiguum*, the posterior petals are much larger than the anterior petals, and all petals are deeply bifid. The posterior petals have widely diverging lobes. The paracorolla is mainly white, but tinged with orange or red,



Fig. 3. *Styloidium nominatum*. Photograph of corolla, paracorolla and column (from Brennan 7978).

and the lobes entire (**Fig. 2**). The capsules are 4.5–12 mm long.

In *Styloidium nominatum*, the posterior and anterior petals are about the same size, and they are circular to somewhat obtuse in shape with an obtuse or emarginate apex. The paracorolla is golden-yellow in colour and the lobes bifid (**Fig. 3**). The capsules are 12–15 mm long.

Conservation status: **Least Concern** (IUCN 2001). The geographic range exceeds 1000 km², and there is no evidence of decline.

Etymology: From the Latin *exiguus* meaning small or meagre, in reference to the stature of the plant.

Styloidium osculum A.R.Bean **species nova** *S. dunlopiano* affinis sed labiis calycis emarginatis, corolla glabra, praesentia paracorollae, labello paginae exteriori tubi corollae affixo et petalis posterioribus connatis differens. **Typus:** NORTHERN TERRITORY. Edith Falls, above top falls, 10 May 2008, *K.Brennan* 7668 (holo: BRI [1 sheet + spirit]; iso: CANB, DNA).



Fig. 4. *Stylidium osculum*. Photograph of corolla, paracorolla and strongly recurved column (from Brennan 7539).

Annual herb, 4–11 cm high with globose glandular hairs 0.03–0.05 mm long. Rootstock not thickened. Stems present, glabrous. Leaves 7–21 per plant, green, scattered along stems or sometimes clustered at upper end of stem, spatulate or obovate. Leaves 5–33 mm long including petiole, 2.6–6 mm wide, glabrous; apex obtuse, base cuneate, margins entire. Petioles 1–20 mm long. Scapes present, 3–10 per plant, green, 0.3–0.4 mm in diameter, glabrous. Inflorescences 4–7 cm long including scape, 1–2-flowered. Inflorescence branches glabrous. Bracts deltate, 0.9–1.1 mm long,

glabrous, acute. Bracteoles absent. Pedicels absent. Hypanthium linear, glandular-hairy at distal end only. Sepals fused into 2 broadly ovate emarginate lips, one lip 3-lobed, the other 2-lobed. Sepals 0.8–1.3 × 0.5–0.7 mm, glabrous or sparsely glandular-hairy, obtuse. Corolla pink, glabrous; tube 2.6–2.8 mm long, sinus on anterior side only. Paracorolla discontinuous, thin, glabrous, *c.* 0.1 mm high, lobes 2, similar, obtuse, both at the base of the posterior petals. Paracorolla glands absent. Labellum attached to outside of corolla tube, lanceolate, 0.5–0.6 mm long, thick, glabrous;

terminal appendage present, c. 0.2 mm long, acuminate; basal appendages absent. Corolla with posterior petals fused, A1+A2+(P1/P2). Anterior petals orbicular, 1–1.3 mm × 0.9–1.2 mm, entire, obtuse. Posterior petals obdeltate, 2–2.5 × 1–1.2 mm, bilobed, obtuse. Column 6.5–7.5 mm long, of uniform width throughout or slightly dilated near distal end, glabrous; lateral lobes present, 0.4–0.5 mm long. Column spur absent. Stigma sessile. Capsule linear, without raised longitudinal ribs, 11–22 mm long excluding sepals, 0.4–0.8 mm wide, halves detaching distally and strongly recurving. Seeds globose or ellipsoidal, 0.15–0.25 mm long, brown, colliculate. **Fig. 1D–F, 4.**

Additional specimens examined: NORTHERN TERRITORY. Edith Falls, at start of Jatbula track, Apr 2008, *Brennan 7539* (BRI); Katherine Gorge N.P., Jun 1975, *Dunlop 3766* (CANB, DNA, NSW); 18 miles [29 km] NE of Katherine, Feb 1965, *Wilson 341* (CANB, DNA).

Distribution and habitat: Recorded from Katherine Gorge and Edith Falls, both in the Nitmiluk National Park, near Katherine in the Northern Territory (**Map 1**). It occurs in receding shallow pools in the bed of a small seasonal stream between sandstone hills. Other *Styloidium* species growing nearby on damp sand included *S. adenophorum* Lowrie & Kenneally and *S. pedunculatum* R.Br.

Phenology: Flowers and fruits are recorded for February, April and May.

Notes: This species has primarily an aquatic habit. Plants are rooted in shallow pools of water, and the erect stems and flowering scapes are emergent from the water.

Affinities: *Styloidium osculum* is perhaps most closely related to *S. dunlopianum* Carlquist, as both have a substantial stem, similar leaf shape, lateral lobes on the column, and sepals fused into two lips. However, *S. osculum* differs by the emarginate calyx lips (entire in *S. dunlopianum*), the glabrous corolla (conspicuously glandular-hairy in *S. dunlopianum*), the presence of a paracorolla (absent in *S. dunlopianum*), the labellum attached to the outside of the corolla tube (attached at base of anterior sinus in *S. dunlopianum*), and the fused posterior petals (free in *S. dunlopianum*).

Conservation status: **Near Threatened** based on criterion D (IUCN 2001). It has a quite small extent of occurrence, but there is no evidence of decline.

Etymology: The epithet is from the Latin *osculum* meaning “little mouth” or “kiss”, and is given in reference to the sepals that are fused into two groups and resemble a little mouth. It is used here as a noun in apposition.

Styloidium notabile A.R.Bean **species nova** *S. muscicola* affinis sed inflorescentia dichasialiter ramificanti, sepalis et tubis corollarum longioribus, labello paginae exteriori tubi corollae affixo, petalis posterioribus connatis longioribus ellipticis et columna multo longiore lobis lateralibus carentibus differens. **Typus:** NORTHERN TERRITORY. Kakadu National Park, near East Alligator River, 29 April 1999, *I.D.Cowie 8325* & *C.R.Dunlop* (holo: BRI; iso: CANB, DNA, MEL).

Annual herb, 15–40 cm high with globose glandular hairs 0.1–0.15 mm long. Rootstock not thickened. Stems present, glabrous. Leaves 9–18 per plant, green, mostly in terminal rosette, with some scattered below, obovate or orbicular, 32–56 mm long including petiole, 12–21 mm wide, glabrous, apex obtuse, base cuneate, margins entire. Petioles 12–25 mm long. Scapes 1–4 per plant, green, 0.5–1.1 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 15–25 cm long including scape. Inflorescences determinate, dichasially cymose; branches glandular-hairy. Bracts lanceolate or ovate, 0.7–1.9 mm long, glabrous, apex obtuse. Bracteoles absent. Pedicels absent. Hypanthium linear, glandular-hairy throughout. Sepals elliptical, 3 free and 2 mostly fused, 2.4–3 × 0.4–0.6 mm, glandular-hairy, apex obtuse or acute. Corolla pink, glabrous or glandular-hairy on tube only. Corolla tube 3.5–4 mm long, with sinus on anterior side only. Paracorolla absent or with 2 small pink obtuse lobes, <0.1 mm long, at the base of the posterior petals. Labellum attached to outside of corolla tube, lanceolate, 0.4–0.6 mm long, glabrous, terminal appendage absent, basal appendages absent. Petals with posteriors fused, A1+A2+(P1/P2). Anterior petals ovate

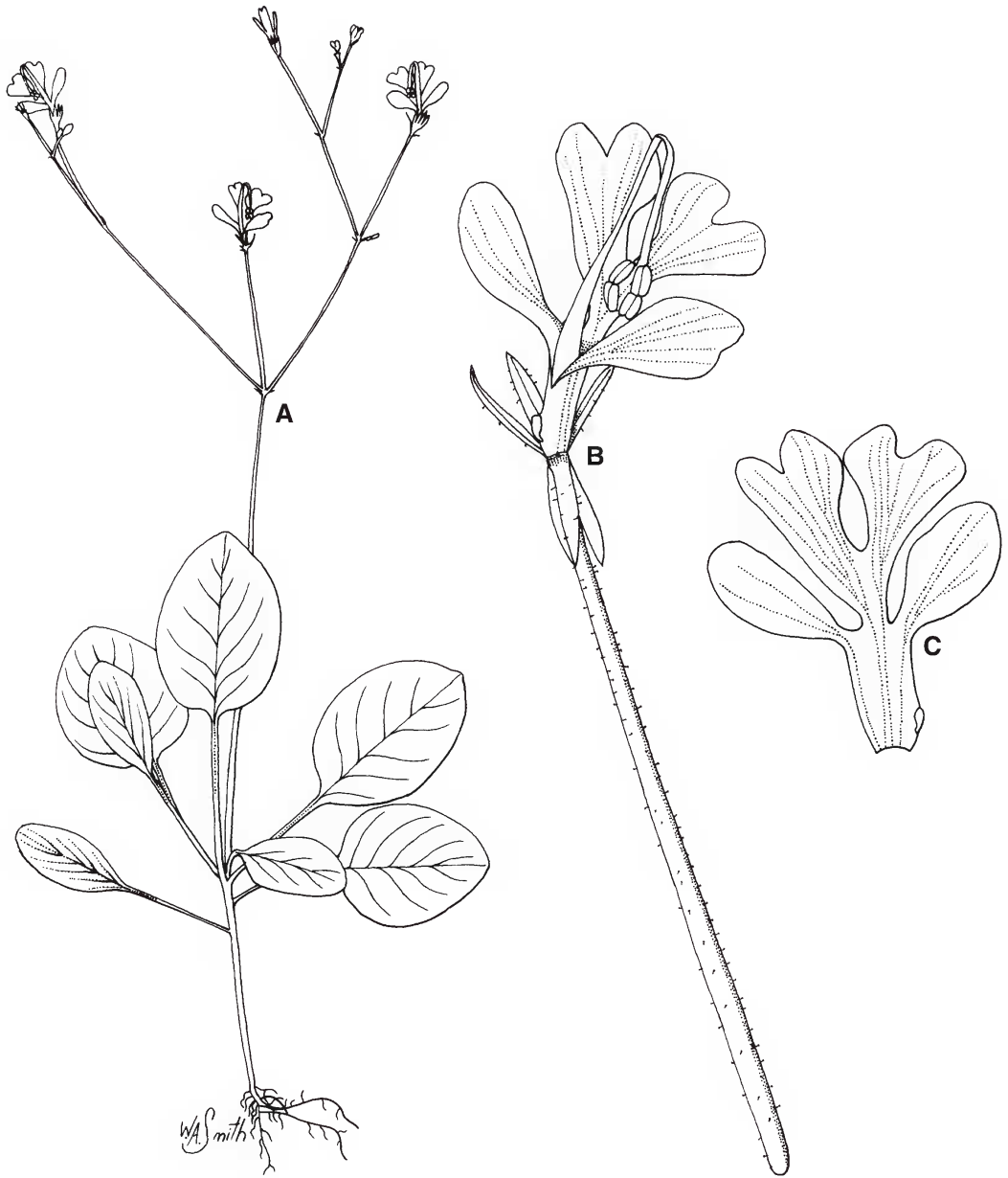


Fig. 5. *Styloidium notabile*. A. whole plant $\times 0.8$. B. flower $\times 4$. C. corolla $\times 4$. All from *Brennan 2116* (DNA).

or orbicular, $3.5\text{--}5.5 \times 2\text{--}3$ mm, shortly bilobed or entire, apex obtuse. Posterior petals elliptical to obovate, $6\text{--}9 \times 1.5\text{--}2.5$ mm, bilobed, obtuse. Column $13\text{--}16$ mm long, of uniform width throughout, glabrous, lateral lobes absent, spur absent. Stigma sessile. Capsule linear, with raised longitudinal ribs,

$17\text{--}22$ mm long excluding sepals, $0.5\text{--}0.7$ mm wide, halves detaching distally, not recurving. Seeds ellipsoidal, $0.15\text{--}0.2$ mm long, brown, smooth. **Fig. 5 & 6.**



Fig. 6. *Stylidium notabile*. Photograph of corolla and strongly recurved column (from Brennan 7578).

Additional specimens examined: NORTHERN TERRITORY. 6.3 km SE of Cahills Crossing, May 1994, *Brennan 2851* (DNA); Kakadu N.P., Mar 1999, *Brennan 3696* (DNA); East Alligator River, Ubirr, Apr 1995, *Brennan 3171* (DNA); East Alligator, in Njarridj complex, Mar 1993, *Brennan 2116* (DNA); Kakadu N.P., Obiri Rocks area, Apr 1987, *Purdie 3147* (CANB, DNA); Obiri Rock (Ubirr), May 1987, *Wannan UNSW20301* (BR1).

Distribution and habitat: *Stylidium notabile* grows on sandstone rock outcrops around Ubirr near the East Alligator River in Kakadu N.P. (Map 1).

Phenology: Flowers and fruits are recorded from March and May respectively.

Affinities: *Stylidium notabile* is related to *S. muscicola* F.Muell. The latter name is currently applied to two or more undescribed species. The present author has examined the type of *S. muscicola*, and the species described here as *S. notabile* differs from typical *S. muscicola* by the dichasially branched inflorescences, the longer sepals and corolla tubes, the labellum attached to the outside of the corolla tube, the longer elliptical posterior petals that are fused near their base, and the much longer column without lateral lobes. According to M.Barrett (*pers. comm.* 2009), a trigger plant similar to *S. muscicola* but with

larger pink flowers occurs in the Kimberley region of Western Australia. It is possible that this is referable to *S. notabile*.

Conservation status: **Near Threatened** based on criterion D (IUCN 2001). It has a quite small extent of occurrence, but there is no evidence of decline.

Etymology: From the Latin *notabilis* meaning remarkable, a reference to the large and showy corolla of this species.

Stylidium centrolepoides A.R.Bean **species nova** *S. turbinato* affinis sed fructibus multo brevioribus, columna pedicellisque brevioribus et praesentia elementorum paracorollae duorum longorum gracilium cultriformium differens. **Typus:** Queensland. BURKE DISTRICT: *c.* 1 km N of the Croydon to Strathmore Homestead road, *c.* 31 km (direct) NE of Croydon, 15 May 2001, *G.P.Turpin GPT413 & E.J.Thompson* (holo: BRI; iso: CANB *distribuendi*).

Annual herb to 4 cm high with ellipsoidal glandular hairs 0.1–0.15 mm long. Rootstock not thickened. Stems glabrous. Leaves 20–100 per plant, maroon or reddish-green, mostly in terminal rosette with some scattered below, linear, 5–10 × 0.3–0.7 mm, glabrous, apex acute, base truncate, margins entire. Petioles absent. Scapes 3–8 per plant, maroon or reddish-green, 0.2–0.25 mm in diameter, glandular-hairy. Inflorescences 1–2 cm long including scape. Inflorescences determinate, monochasially or dichasially cymose. Inflorescence branches glandular-hairy. Bracts linear, 0.7–1.4 mm long, glabrous, apex obtuse. Bracteoles absent. Pedicels 1.4–2 mm long, glandular-hairy. Hypanthium obovoid to obconical, glandular-hairy throughout. Sepals oblanceolate, all free, 1.2–1.4 × 0.3–0.4 mm, sparsely glandular-hairy or glabrous, apex obtuse. Corolla pink, tube glabrous, petals glandular-hairy on underside. Corolla tube 0.3–0.4 mm long, with sinus on anterior side only. Paracorolla not continuous, thin, glabrous, comprising two slender outgrowths 0.6–1.3 mm high at the base of the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, *c.* 0.4 mm long, thick, glabrous, terminal appendage absent, apex obtuse,

basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 1.3–1.5 × 0.4–0.5 mm, entire, apex obtuse or acute. Posterior petals 1.2–1.3 × 0.6–0.7 mm, entire, apex obtuse. Column 1.5–2 mm long, slightly dilated at distal end, with eglandular hairs only, lateral lobes absent, spur absent. Stigma sessile. Capsule ellipsoidal to obconical, with raised longitudinal ribs, 1.3–1.6 mm long excluding sepals, 1.1–1.3 mm wide, halves detaching distally, not recurved. Seeds ellipsoidal, *c.* 0.15 mm long, brown, surface foveolate. **Fig. 7.**

Additional specimen examined: Queensland. COOK DISTRICT: 'Abington Downs', 13 km N of Bel Bel crossing, 108 km NW of Georgetown, Aug 2006, *Appelman R323 & Wilson* (BRI).

Distribution and habitat: The two known populations of *Stylidium centrolepoides* are north-east of Croydon and north-west of Georgetown in north Queensland (**Map 1**). It is found on flat ground in association with *Melaleuca viridiflora* Sol. ex Gaertn., *Corymbia polycarpa* (F.Muell.) K.D.Hill & L.A.S.Johnson, and at one site, *Eucalyptus melanophloia* F.Muell.

Phenology: Flowers and fruits are recorded for May and August.

Affinities: *Stylidium centrolepoides* is most closely related to *S. turbinatum* Lowrie & Kenneally from the Northern Territory and northern Western Australia, with which it shares a conspicuously ribbed hypanthium and free sepals. It differs, however; by the much shorter fruits, the shorter pedicels and column, and the presence of two long slender knife-like paracorolla elements. *S. centrolepoides* is also related to *S. floodii* F.Muell., a species that is found in the Croydon area. It differs from *S. floodii* by the conspicuously ribbed hypanthium, the knife-like paracorolla elements, the much shorter column, and the shorter fruits.

Conservation status: Data deficient (IUCN 2001). The species does not grow in a special microhabitat (E.J.Thompson, *pers. comm.* 2009) and hence it could be expected to grow over a large area. Presumably, its ephemeral nature and small size have precluded its detection until recent times.



Fig. 7. *Styliidium centrolepoides*. A. whole plant $\times 4$. B. flower and pedicel $\times 16$. C. corolla and paracorolla $\times 24$. D. fruit $\times 16$. All from Turpin GPT413 & Thompson (BRI).

Etymology: The specific epithet is given for the vegetative resemblance between this species and *Centrolepis exserta* (R.Br.) Roem. & Schult., which has leaves of similar size, shape and colour.

Acknowledgements

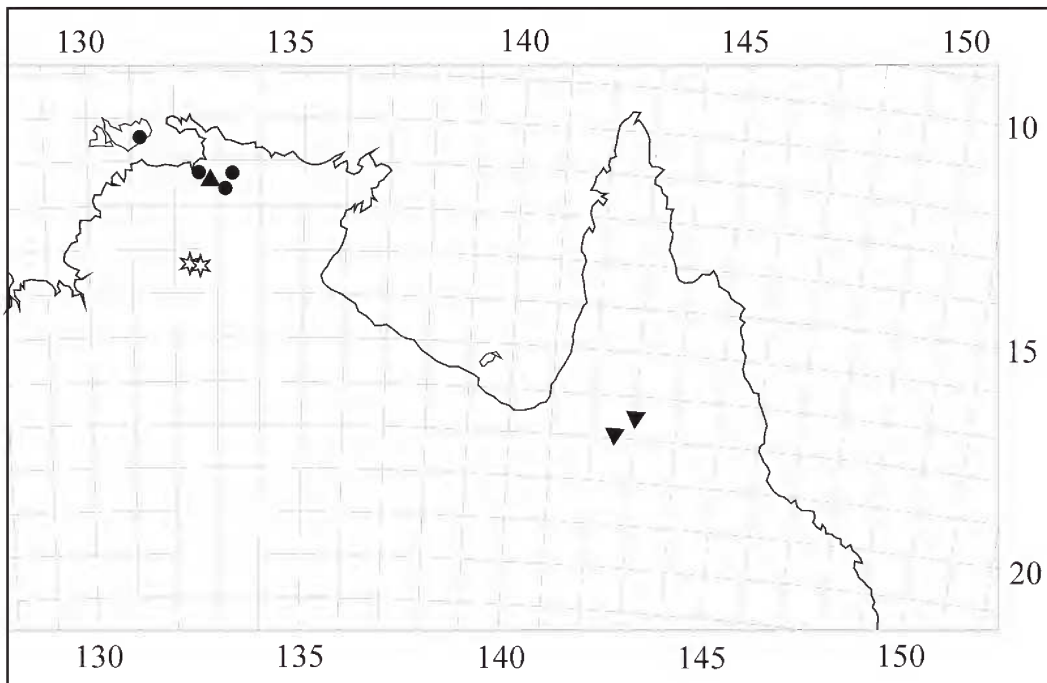
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References

BEAN, A.R. (1999). A revision of *Stylidium* sect. *Debilis* Mildbr., *S.* sect. *Floodia* Mildbr. and *S.* sect. *Lanata* A.R.Bean (Stylidiaceae). *Austrobaileya* 5: 427–455.

— (2000). A revision of *Stylidium* subg. *Andersonia* (R.Br. ex G.Don) Mildbr. (Stylidiaceae). *Austrobaileya* 5: 589–649.

IUCN (2001). *Red List Categories and Criteria: Version 3.1*. IUCN Species Survival commission. IUCN: Gland/Cambridge.



Map 1. Distribution of *Stylidium* species [●] *S. exiguum* [▲], *S. notabile* [☆], *S. osculum*, [▼] *S. centrolepoides*